

FIG. 1 (PRIOR ART)

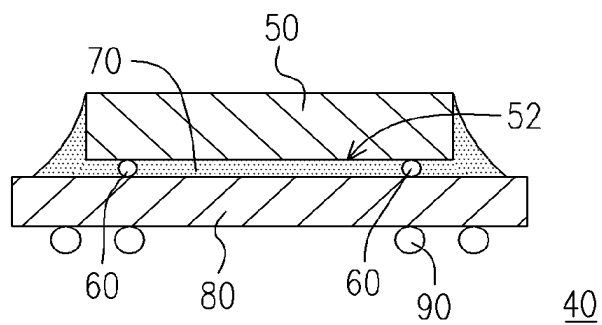


FIG. 2 (PRIOR ART)

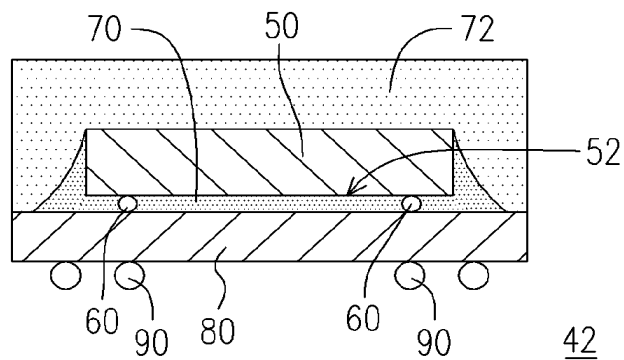


FIG. 3A (PRIOR ART)

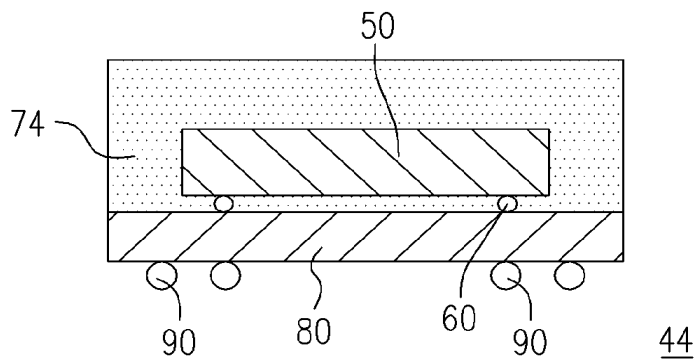


FIG. 3B (PRIOR ART)

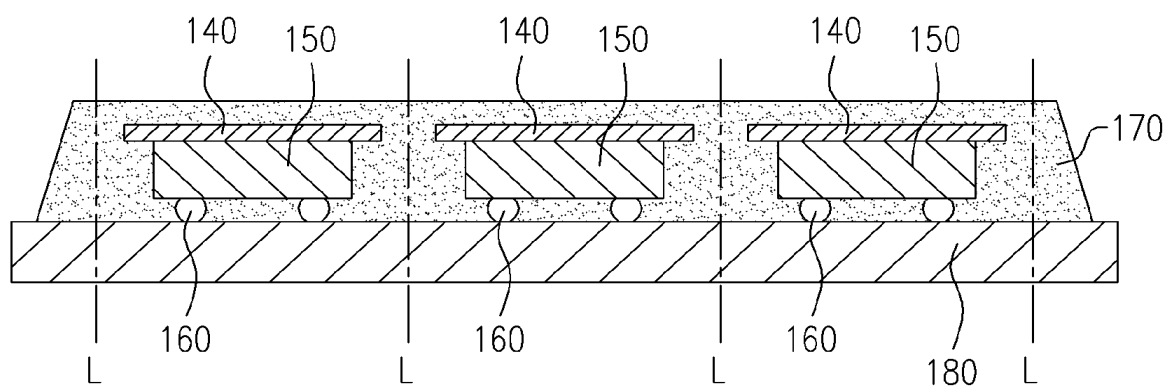


FIG. 7A

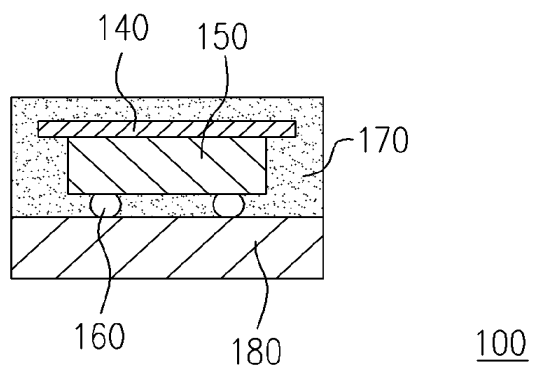


FIG. 7B

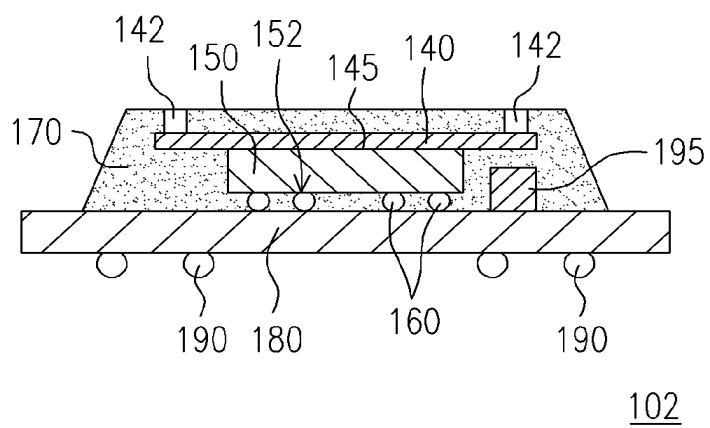


FIG. 8

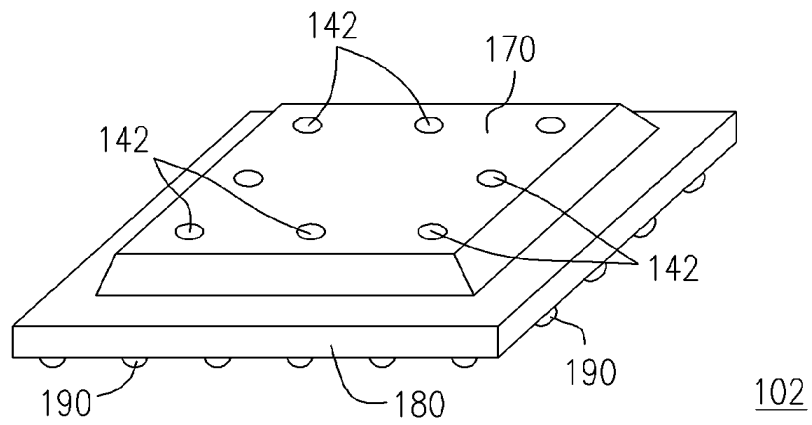


FIG. 9A

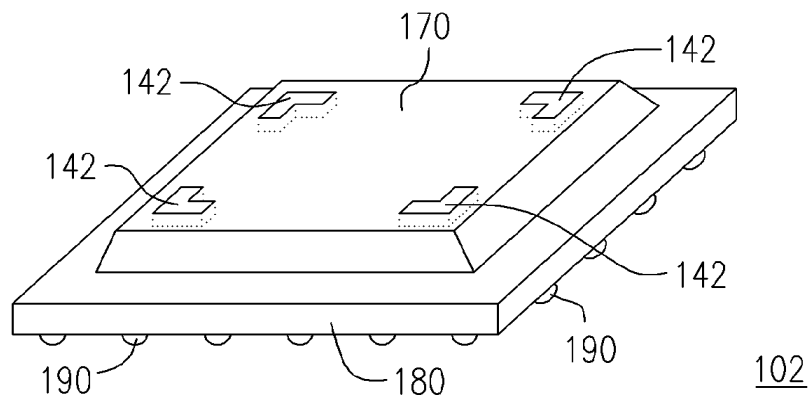


FIG. 9B

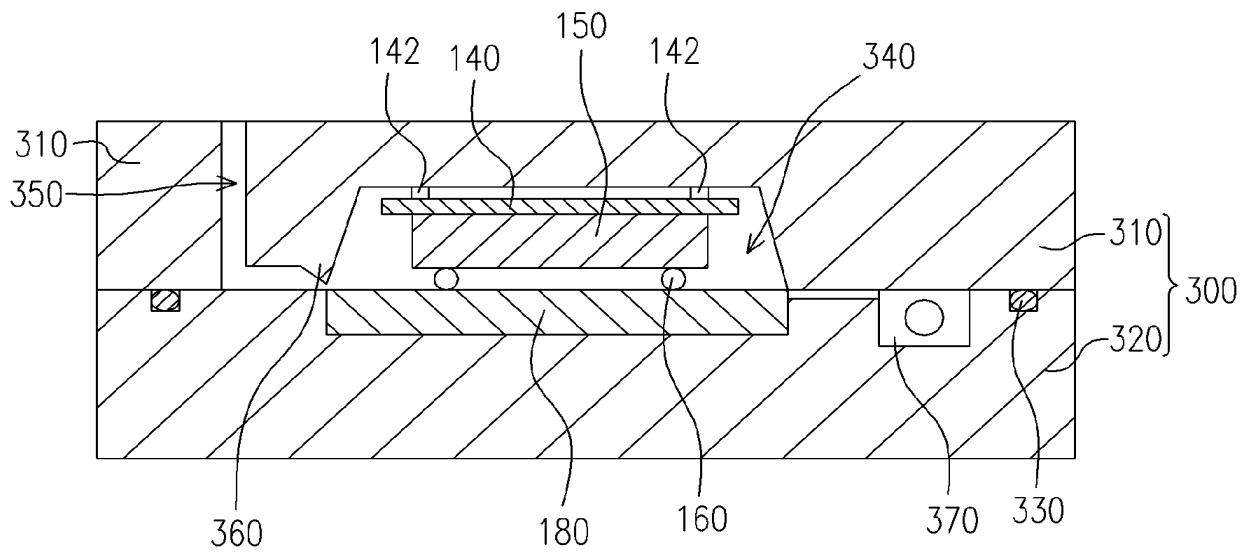


FIG. 10

	Example 1	Example 2	Example 3	Example 4	Example 5
Carrier Warpage *1	20μm	20μm	20μm	20μm	20μm
Soldering persistency *2	▲	▲	▲	▲	▲
Temperature cycle reliability *3	2000 cycles	2000 cycles	2000 cycles	2000 cycles	2000 cycles
PCT reliability *4	> 500 hours	> 500 hours	> 500 hours	> 500 hours	> 500 hours
Heat dissipating capacity *5	6 minutes	9 minutes	9 minutes	7 minutes	30 minutes

	Example 6	Example 7	Contrast example 1	Contrast example 2	Contrast example 3
Carrier Warpage *1	20μm	20μm	80μm	40μm	50μm
Soldering persistency *2	▲	▲	X	O	▲
Temperature cycle reliability *3	2000 cycles	2000 cycles	2000 cycles	2000 cycles	2000 cycles
PCT reliability *4	> 500 hours	> 500 hours	96 hours	168 hours	> 500 hours
Heat dissipating capacity *5	> 60 minutes	25 minutes	10 minutes	30 seconds	30 seconds

*1 carrier warpage: computed according to the height above a corner-to-corner diagonal line of the carrier.

*2 solder persistency: ▲: JEDEC level II passed; O: JEDEC level III passed;

(n = 11) X: JEDEC level III failed

*3 temperature recycle reliability: gaseous surrounding, 65°C/15 min ~ 150°C/15 min

(n = 11)

*4 PCT reliability: 121°C/2atms

*5 heat dissipating capacity: passing of a 10mA current through aluminum wires on the surface of the device and measuring the interval needed for the aluminum wires to fuse.

FIG. 11